VALIDATION OF 2D INDEPENDENT CW DOPPLER CO MEASUREMENTS IN PRETERM NEONATES BY COMPARISON WITH ECHOCARDIOGRAPHY

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Objective measurement of cardiac output (CO) in pre-term neonates is important for clinical management. Doppler ultrasound is the preferred method for measurement of CO however the pulmonary and aortic valve diameters for calculating flow volumes are small, and measurement using 2D ultrasound, particularly of the pulmonary valve, requires expertise and experience. The USCOM (USCOM Ltd, Sydney, Australia) is a novel 2D independent CW Doppler device which calculates flow volumes using anthropometrics. The device is simple to operate and less expensive than conventional echo.
This study was to compare 2D echo and USCOM CO measurements in pre-term neonates.

Method:
After IRB approval 66 paired measures of transpulmonary CO were acquired in 37 pre-term neonates (weight 1.13±0.47kg) using conventional echocardiography, combining 2D and CW Doppler, and the USCOM device. Signals were acquired and analysed independently and in a blinded fashion, and values compared by two tailed t-tests and Bland-Altman bias analysis.

Results:
Mean values of transpulmonary CO were 0.36±0.19l/min by echo and 0.37±0.14l/min by USCOM and not significantly different ($r=0.9134$, $p<0.005$). The mean difference between measures was 0.00±0.08l/min, with a mean % error of -3.7%. The smaller SD associated with USCOM convert to smaller 95% CIs and a possible increased sensitivity for detection of haemodynamic change.

Conclusion:
These results suggest that USCOM is as accurate for measurement of neonatal CO as conventional echo, and may make a cost-effective contribution to neonatal haemodynamic management.

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